Architectural Theses

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A CONSERVATORY OF MUSIC

BY

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THESIS

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THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

Charles Clyde Rich

ENTITLED A Conservatory of Music

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE DEGREE

OF Bachelor of Science in Architecture

N. Clifford Ricker.

HEAD OF DEPARTMENT OF Architecture

A CONSERVATORY OF MUSIC.

It has seemed desirable to limit this thesis design to a building which in its accomodations is required only for the actual instruction and training of students seeking a musical education. It was assumed at the outset that the conservatory would be located in a large city where dormitory and home advantages for practice, together with educational advantages in the other arts, would be easily available. It was also assumed that theater and opera privileges existed in the city separate from the school, and that no provision need therefore be made for scenic or spectacular stage effects.

No institution, however, is complete without an assembly hall. A College of Music, especially, should include a large concert auditorium, which should, of course, serve the public as well as student audiences. Such a hall with a seating capacity of sixteen hundred people, aside from a total stage capacity of three hundred ninety, has been provided in this design. Larger area could not well have been alloted to this portion of the plan, since relative proportions in the composition of building masses practically determined the size of

the dome which roofs the hall and forms the central feature in the main façade. Effort has been made to secure an open and monumental aspect in entrance, corridors and rest rooms, all of which are really distinct from the school proper. Spacious stairs lead from either end of the entrance vestibule to the gallery above. The stage has an amphitheater arrangement with space for three hundred chorus singers and an orchestra of at least ninety pieces. An immense pipe organ is built over the passage at the rear, and the entire apartment is ceiled over with a curved reflector. Should it seem desirable, this reflector might be hoisted, and scenic paraphernalia let down from a lift above.

Very little investigation has been made into the acoustic problem, except in a general way. It is generally known that annoying echoes are dispensed with in great measure by lowering the ceiling and by breaking up its surface with carved or moulded ornament. Canvas mural decorations, plush and textile hangings are acknowledged to have sound-absorbing properties, and although no tests have been made and no details shown, the height of the ceiling in this design does not exceed sixty feet, and there is abundant opportunity to use any or all of the above mentioned materials.

The general plan has been evolved from suggestions and recommendations made by several authorities connected with large conservatories, a list of which is appended to this text. The following is a program of requirements prepared in compliance

with the various suggestions received from the gentlemen hereinafter cited, and from numerous other programs which were found in the Architectural Library. This program has been adhered to very closely in planning the present design.

Original Program

A Conservatory of Music to be built in a large city, and to provide for the instruction of at least six hundred students, male and female, in vocal, piano, organ, and other stringed and wind instruments. The building to be monumental in character, and built in accordance with the best known methods of fire-proof, sound-proof and accoustic construction. The following rooms and apartments are to be included:

A Concert Hall to seat about two thousand people, containing also a large pipe organ and a stage to seat about five hundred. This Hall to be distinct from the school proper.

Monumental Entrance Vestibules including space for statues of musicians.

Two Chorus Rooms, one for men and one for women, each to have an area of about eighteen hundred square feet.

Two Dressing Rooms for chorus singers, each about fifteen hundred square feet, with separate retiring and dressing rooms for artists.

Two Recital Halls, each to seat about four hundred and

to contain a pipe organ and a small stage.

Two Rooms, one for Orchestra and one for Band, each about twentyfive hundred square feet.

Four Class Rooms about four hundred square feet each.

Thirty Instruction Rooms about two hundred square feet each.

Director's Offices.

Two Suites of Parlors.

A Library containing about fifteen hundred square feet.

A small Music Store.

Ticket Offices, Toilet and Locker Rooms.

The Entrance to the auditorium is from one principal street and the school entrance is from another equally important street, a large raised court intervening. A museum for casts of musicians, paintings, collections of musical instruments, etc., forms the entrance corridor. Wide staircases at both ends lead to the gallery and practice rooms above. Passages on either side of these stairs lead to recital halls, each designed to seat about three hundred fifty people, and each provided with a small stage and pipe organ. Artists' parlors and dressing rooms occupy the space just back of the stage and directly opposite the school entrance. Large band and orchestra rooms with separate apartments for instruments overlook the street on either side of the entrance. Two open courts supply light and ventilation for the wings on either side. A twelve foot corridor leads entirely around these courts

and furnishes ready access to the numerous lecture rooms and private studios. A Library and suite of club rooms are located at opposite points in the extreme ends of either wing. Two chorus rooms, one for men and one for women, are placed opposite the stage entrances on either side, while dressing rooms and toilets are distributed throughout the central portion of the building. Lettering on the plan indicates the location of such rooms as are of importance on the basement and second floors. It is intended that the basement be used for storage and heating purposes; however, ready access may be had under all of the principal stairs to the basement floor, where practice rooms or studios might be available.

At a few points about the building artificial or forced ventilation might be found necessary in the construction, as for example, the two large locker and toilet rooms. It is possible also that indirect lighting in the dressing rooms would be found inadequate. It is assumed, however, that these rooms would be used mainly in the evening when artificial light alone would be employed.

The building is designed to be built entirely of cut stone, with fire-proof and sound-proof hollow tile partitions and floors, details of which appear later in this text. The upper shell of the dome is octagonal, trussed from the eight large piers. The ceiling which is separate from the steel work, is of arched hollow tile construction. The roof of the dome is composed of white enameled tiles and white marble. All other roofs are of white tiles.

A most important subject for consideration in the construction of a school of music is that of sound-proofing floors and

partitions. There are probably three distinct ways in which sound may be transmitted from one room or apartment to another. First, sound waves from the human voice or from instruments strike transoms, doors and partitions, and excite secondary waves in these objects, which in turn set up wave motions in the air on the other side. Second, sound waves may proceed directly on the air from one room to another through vent pipes, flues, chases and other openings. By actual experiment it is found that upon opening a window of a room to outside air the quantity of sound escaping to an adjoining room is materially decreased. Third, sound may be transmitted entirely along material conductors other than air.

The author, of course, has been unable to perform actual tests to ascertain the sound resisting properties of various materials. He has succeeded in gathering information concerning only two types of construction, and this from but two actual tests made upon buildings. Letters were sent to three manufacturing firms asking for information, namely: The Northwestern Terra Cotta Company, The National Fireproofing Company, and the Samuel Cabot firm at Boston. The letters and printed matter sent in reply to these requests (and indeed all communications and enclosures relating in any way to this design) are submitted herewith as a part of this thesis. It will be seen that Mr. Wagner's reply from the Northwestern Terra Cotta Company states that no tests for sound-proofing have been made by that firm. The National Fireproofing Company sent considerable material, all relating to hollow tile construction. A sheet was included giving approximate

percentages of efficiency for walls and floors variously designed in hollow tiles, metal lath and plaster, which results were obtained from tests made by Mr. Dwight L. Perkins, Architect, for the Steinway Hall at Chicago. Nothing is said concerning the methods used in conducting these tests, and we are left to draw our own conclusions. The construction giving the best satisfaction is shown in Figs. 1 and 2.

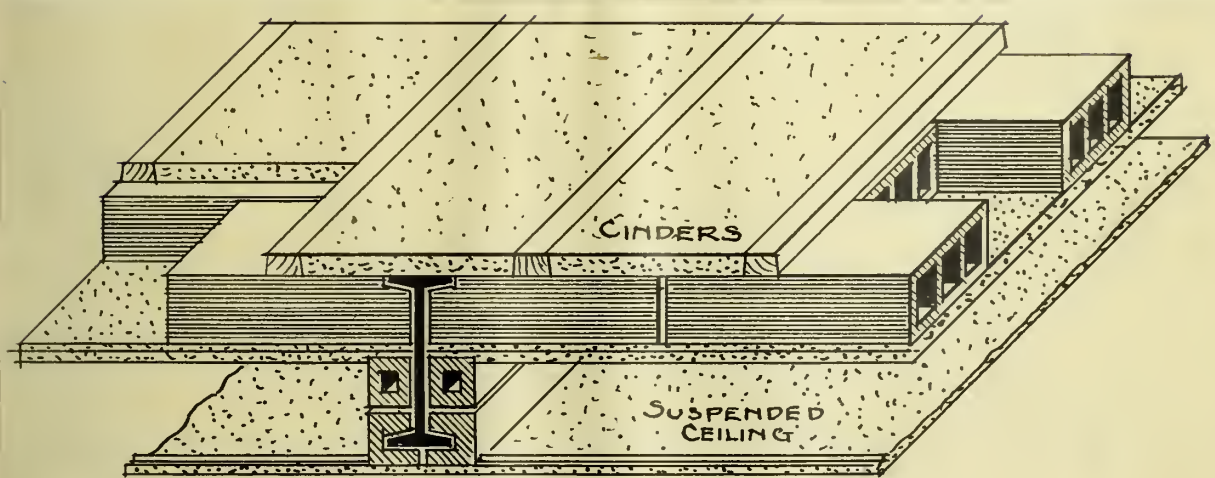

FIG. 1

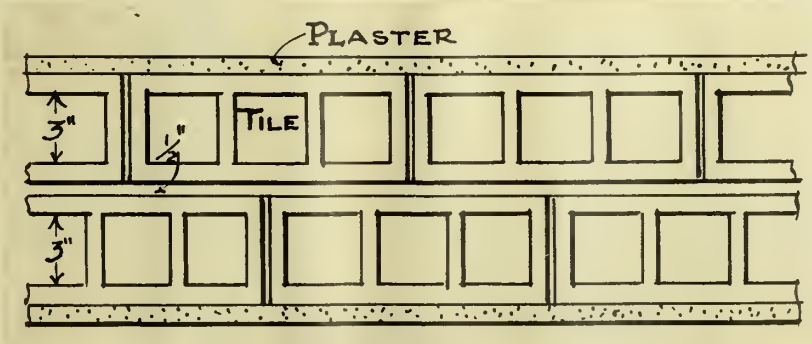

FIG. 2

It would seem that sound is transmitted more readily through doors, and along pipes and chases than through the wall itself. It may be advisable, therefore, to encase the pipes in wall chases packing them with mineral wool, and to use double padded doors.

Hollow tile walls are fire-proof beyond a doubt, but it is questionable whether they resist sound waves as effectively as a spongy or quilted material.

The Cabot Company states that the tests made for the New England Conservatory of Music at Boston are the most satisfactory and reliable yet attempted. A report upon these tests as conducted by Professor Norton of the Massachusetts Institute of Technology was sent with their letter. The results are conclusive. Padded or quilted material used in several layers upon wooden studs or beams, as shown in Figs. 3 and 4, or upon channels with metal lath and plaster, gives good efficiency, and is, as they claim, very much cheaper than hollow tile or genuine fire-proof construction.

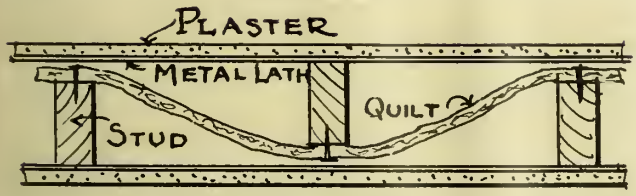

FIG. 3

Such quilted material is made by matting eel-grass into a cushion held in place between two layers of paper, or, better still, of asbestos. This grass is not highly inflammable and the asbestos quilt is therefore in a measure fire-proof.

Fig. 5 shows the use of a combination of two layers of plaster block on metal frame work with quilt between.

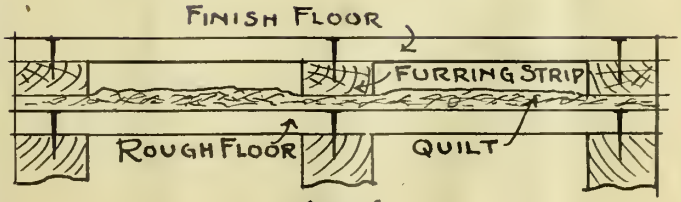

FIG. 4

This arrangement is said to give excellent results in that conservatory. Fig. 6 shows a similar arrangement with plaster board wired to metal studding. Professor Norton recommends the use of wood

studs rather than steel chanels unless the fire risk is materially increased by such construction. He also states that some form of suspended ceiling is needed, since the concrete slab transmits sound across the top of the partition readily. The difficulty encountered is not so much that of the direct passage of sound waves through the building material as their transmission along the material, especially along the floor tiles and beams, with which pianos and other instruments are in direct contact. It seems, then, that additional advantage would be gained by placing such instruments upon cushion pads which are thick enough to resist in considerable measure the transmission of sound waves. Heavy carpets or cork mats certainly reduce the effect of thuds and sudden impacts.

Fig. 5

Fig. 6

From the investigation it would seem that absolute fire-proof and sound-proof construction have not yet gone hand in hand, but that where the

risk is not too great almost perfect accoustic results may be obtained by using the system shown in Fig. 7 with some form of suspended ceiling. Where absolute fire protection is required in connection with sound-proofing it is probable that no more satisfactory methods may be employed than those shown in Figs. 8 and 9, which are in reality combinations of the two systems employed by the National Fire-proofing Company and the Samuel Cabot firm of Boston.

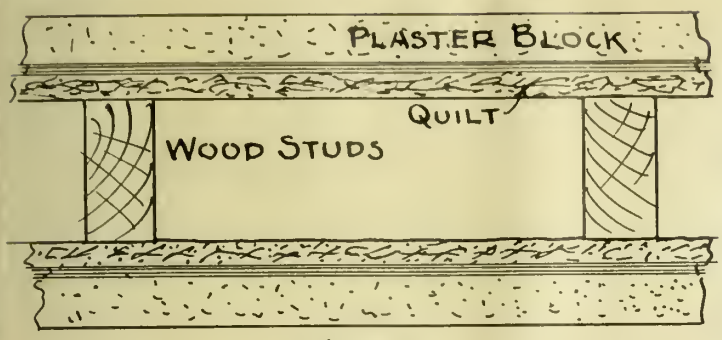

FIG. 7

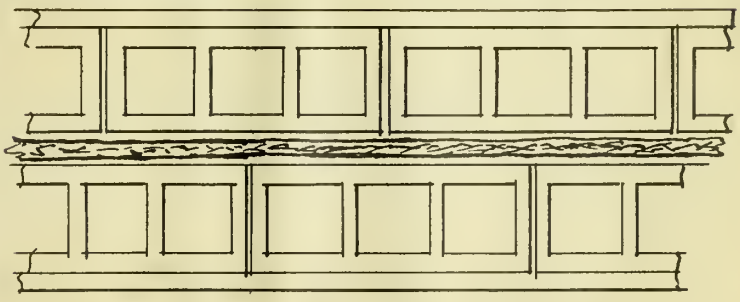

FIG. 8

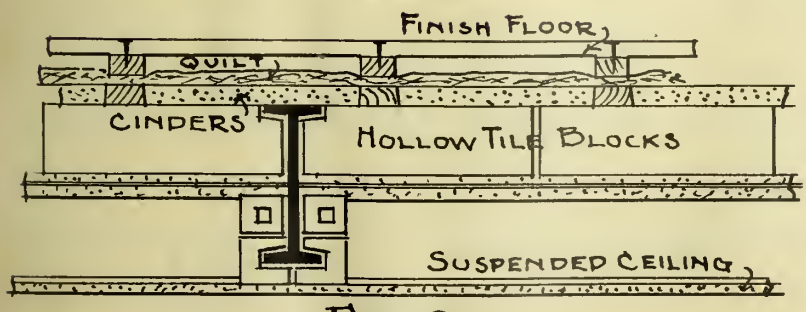

FIG. 9

The drawings included in this thesis are as follows:

(a) One Plan of Main Floor at 1/16" scale,
(b) One Principal Elevation at 3/32" scale

Following is a list of authorities from whom information has been gathered and to whom the author is indebted:

Mr. Theo. Presser, Publisher of The Etude,

Mr. Ralph Flanders, New England Conservatory,

Sir. C. H. H. Parry, Royal College of Music, London,

Mr. C. W. Morrison, Oberlin College of Music,

Mr. C. H. Blackall, Pres. Rotch Scholarship Board,

National Fire-proofing Company,

Professor F. R. Watson,

Professor Charles L. Norton,

Samuel Cabot Manufacturing Company,

Northwestern Terra Cotta Company,

Professor J. W. Case,

Professor N. C. Ricker,

Professor N. A. Wells.